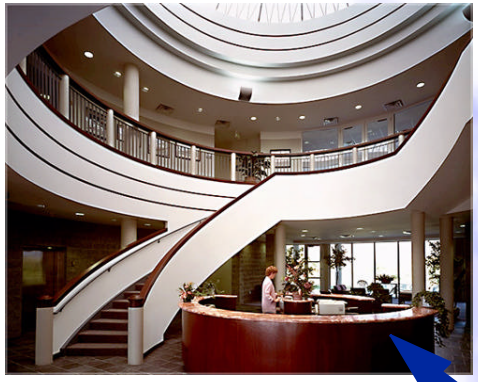
Chem/Bio Transport & Fate

Mitigation, Deterrence, Response

"...to predict accurately the dispersion and ultimate fate of chemical and biological agents released into the environment..."



Indoor

Regional

Multiple Interacting Scales

Complex Urban

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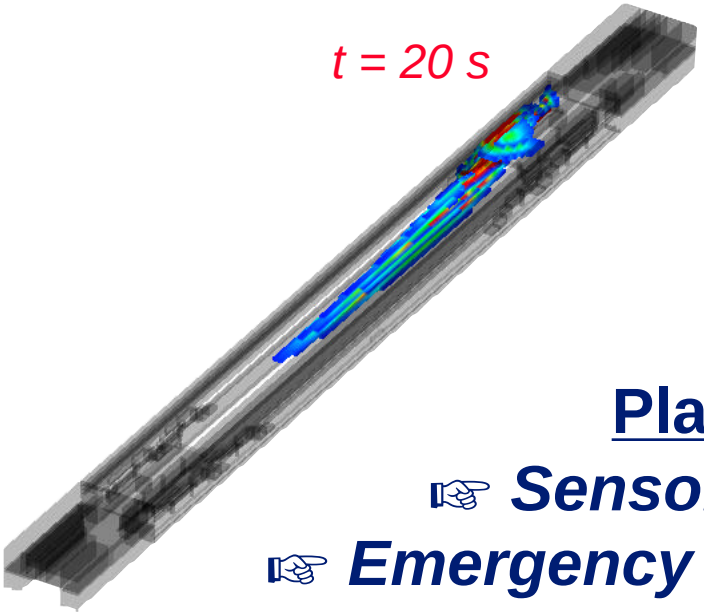
Scenario Case Studies - Subway Station

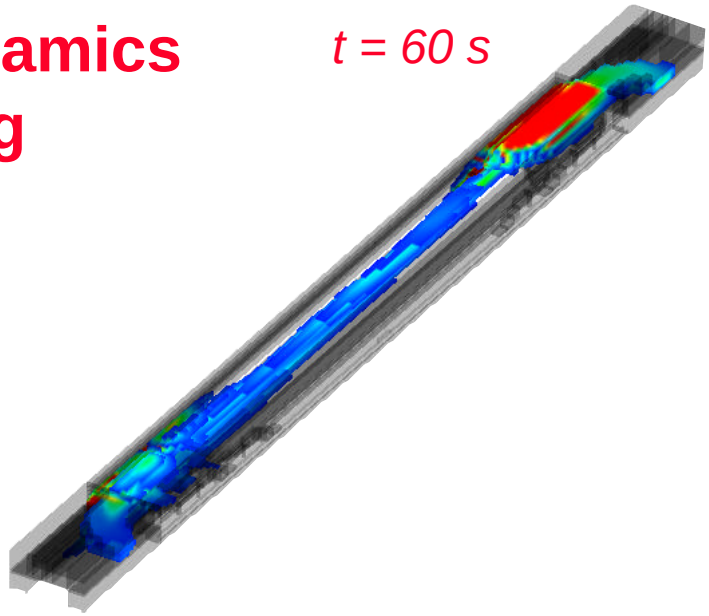
point chemical release at one end of the passenger platform

t = 20 s



3-D Fluid Dynamics Modeling

t = 60 s



Planning

- ☞ ***Sensor Placement***
- ☞ ***Emergency Response Training***

Emergency Response

- ☞ ***Medical Triage***
- ☞ ***Sheltering/Evacuation Decisions***
- ☞***Protection of Responding Personnel***

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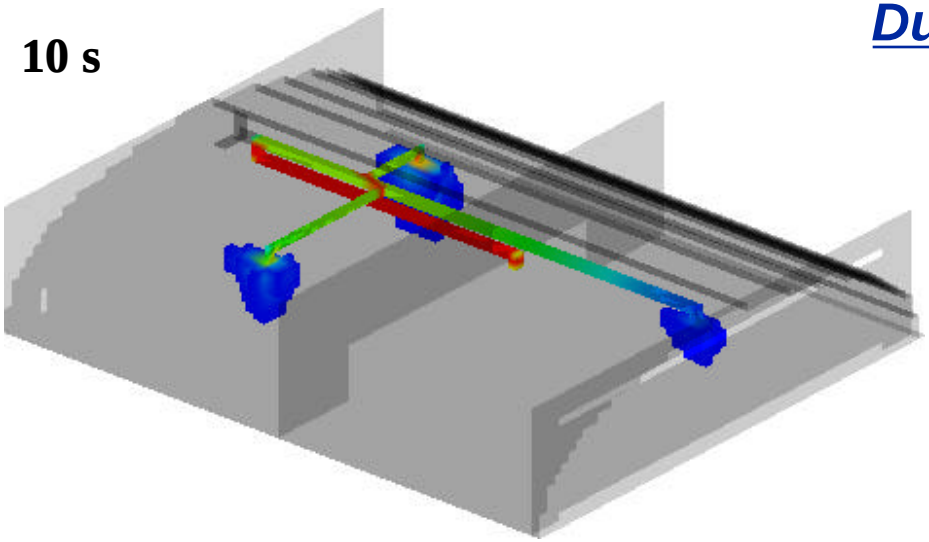
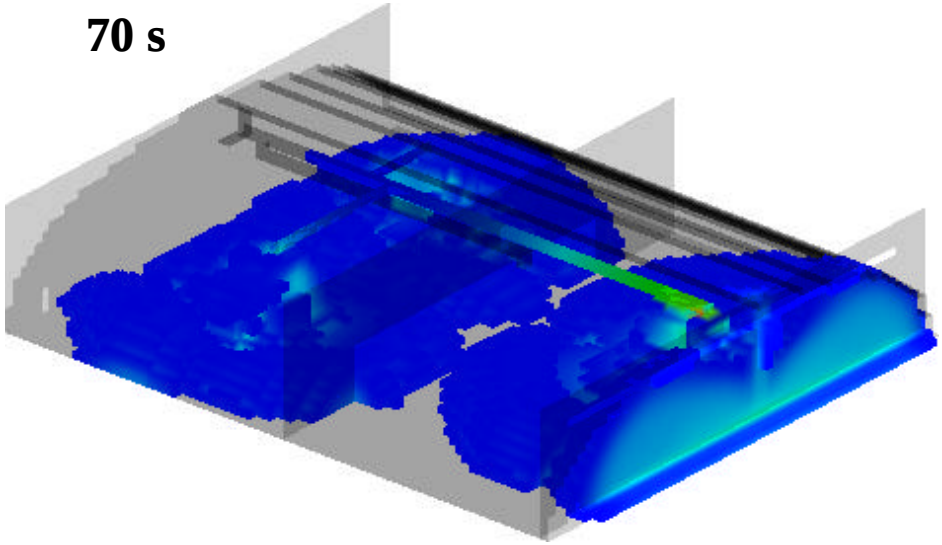
Scenario Case Studies - "Convention Center"

10 s



70 s



Dugway Hangar Preliminary Analysis

- model hanger interior with a single 3D block of 45,000 cells
- model internal ductwork as 1D network by walling off 3D cells
- duct velocities fixed to measured values
- center curtain modeled as sheet of cell walls
- experiment releases:
  - BG anthrax simulant
    - 4-10 microns
    - 98 g
    - 90% in 30s
    - 100% in 60s
  - propylene gas
    - 150 l/s
    - 60s

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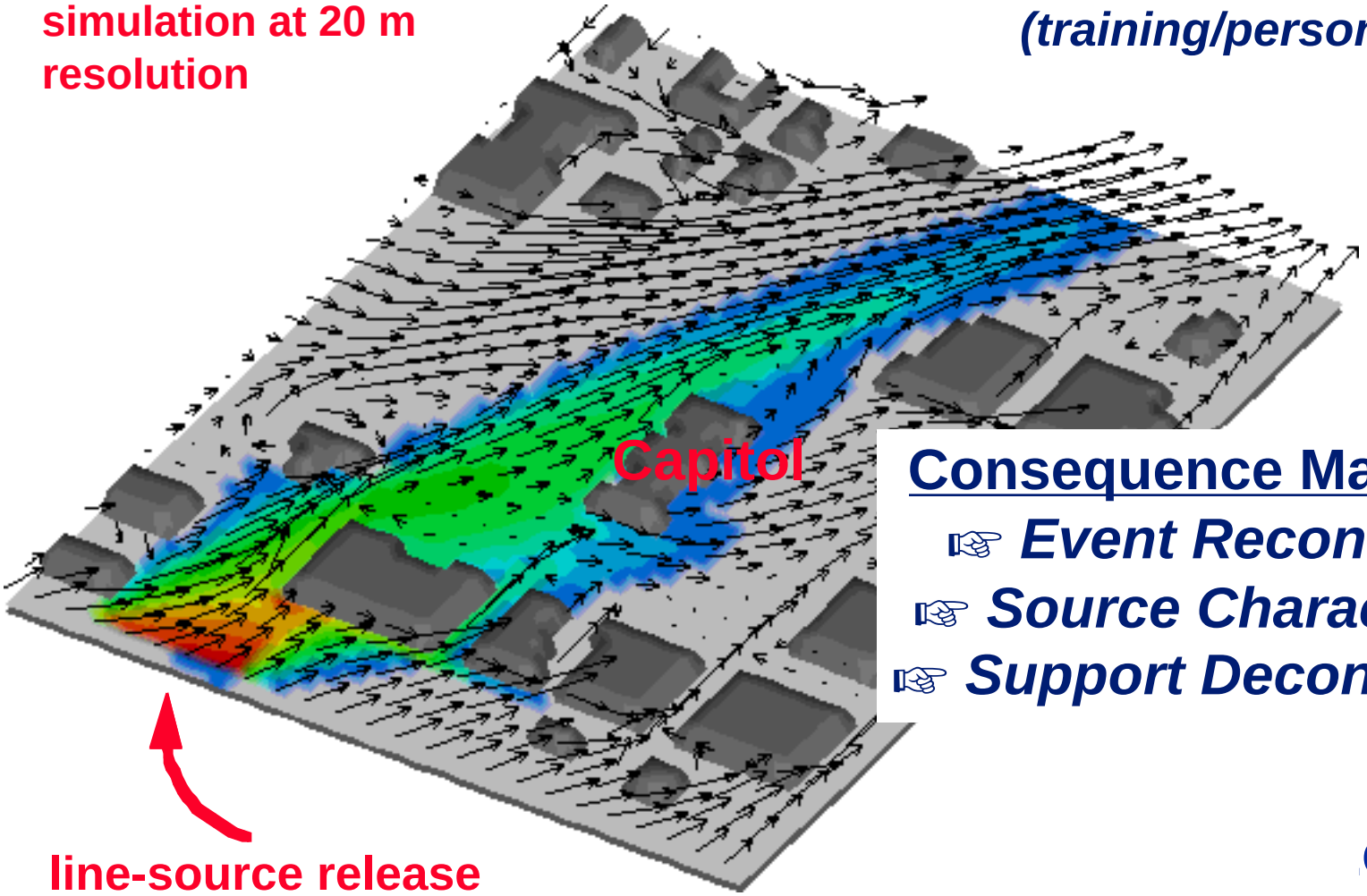
Scenario Case Studies - Washington Mall

3-D fluid dynamics simulation at 20 m resolution



Supporting the First Responder

☞ ***Rules-of-thumb***
(training/personnel safety)

Consequence Management

☞ ***Event Reconstruction***

☞ ***Source Characterization***

☞ ***Support Decontamination***

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